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Serial No. 09/681,953 RD-27,700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Nelson Raymond Corby, Jr. : Group Art Unit: 2876

Serial No.: 09/681,953 : Examiner: Steve S Paik

#9 Appeal Brief
M. Brunson 6/20/03

Filed: 29 June 2001

For: Computer And Human Readable Part Markings And System And Method Using Same

APPEAL BRIEF

Table of Contents

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I. Real Party in Interest.

The inventor named in the present application has assigned his entire right, title, and interest in the invention described herein to General Electric Company, his employer. See Reel No. 011994, Frame 0145.

II. Related Appeals and Interferences.

There are no known related appeals and interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

III. Status of Claims.

Claims 1-5, 7-10 and 12-20 stand rejected in this case; no claims are objected to and no claims are allowed. Applicant appeals the rejection of claims 1-5, 7-10 and 12-20.

Claims 1-5, 7-10 and 12-20 are rejected under 35 USC § 102 (e) as being anticipated by Behrens (US 6,434,340). Claim 12 also stands rejected under 35 USC § 112.

IV. Status of Amendments.

Claims 1-3, 5, 7, 8, 10, 12-14, 16, 17, 18 and 19 were amended and claims 6 and 11 were cancelled in response to the first office action dated 22 June 2002 to define the patentable subject matter more clearly. Claim 12 was further amended in response to Final Office Action dated 7 January 2003 to overcome a 112 rejection.

The amendment to Claim 12 following final rejection was not entered; in so much as Applicant amended the claim after final to the claim language suggested by the Examiner, this rejection is not further addressed in this appeal. Appellant filed a Notice of Appeal, with a Certificate of Mailing, on 7 April 2003.

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V. Summary of Invention.

A. The Problem to be Solved.

Permanent identification marks are generally placed on parts to serve a variety of purposes including tracking of parts, verifying proper assembly, maintaining inventory, proper servicing etc.

Typically the identification marks include a string of characters (e.g. numbers, letters and special symbols). Traditionally these marks are machine-readable only, for example bar codes. It is also desirable that these marks be human readable as well. Previous solutions to address the human-readable aspect include for example, using special fonts such as OCR-A or OCR-B to improve machine (computer) recognizability while allowing human readability. This solution has a drawback that OCR fonts can be easily damaged on the marked surface which may lead to misrepresentation and errors in identification. Another solution is to etch font characters from a matrix of dots and these characters are read optically by a human or machine by forming an image of the character string with sufficient contrast to read the characters against a background surface. For computer recognition, the character string is optically imaged, digitized and optical character recognition software is used to recognize the characters. This solution has an error rate of 1-2% and often exceeds 10-15% errors. Another solution is to provide two sets of distinct markings, one being human-readable and the other being machine-readable. This has the drawback of taking too much space on the part and errors may arise if one of the two marking is damaged.

See generally specification, page 1-3.

B. Appellant's Invention for Solving the Problem.

Appellant addresses the problem of providing a single set of markings that is both human and machine readable. The marking comprises alphanumeric human readable characters for example A B C (or 123 or a combination like ABC 123) that indicate a part number. Each of these human readable characters is formed by a pattern of dots, that are arranged in a 2D redundant bit pattern (that is dots arranged in such a pattern), which bit pattern is machine readable. The 2D redundant bit pattern thus provides both an encoded information string that represents the alphanumeric human readable characters and a visual representation of that number or letter that is readable by humans. Redundancy in the bit patter assures that if some portion of the 2D pattern is obliterated, there is sufficient information left in the pattern to enable a machine to still read the entire encoded string of alphanumeric characters represented by the 2D pattern. See generally specification at page 3 and 4 and Fig.1.

For placing the mark, an "image" of the first letter of the string, e.g. "A", (expressed as a 2D font or typeface of character) is used as a 2D "mask" to extract a sub-set of the bits of the 2D redundant bit pattern enclosed within the 2D mask and comprises the reference encoding for the alphanumeric string of characters. Ideally, the extracted area of the 2D pattern contains a spatial indicator also called a spatial registration marker (mark shown as a "+" sign in the Fig. 3) in the pattern. The resulting subset of bits is printed on the part of interest. To a human, the resulting set of bits appears as a bounded area of bit texture that is recognizable as the character "A". The second character in the string is next considered. Following this example, an image of the letter "B" is used as a mask to extract a different sub-set from the same underlying 2D redundant bit pattern encoding the string ABC123 and comprising the spatial indicator. The extracted subset of bits corresponding to "B" are then printed adjacent to the first character on the part to be marked. The process continues until all characters are printed. At this point a human would be able to read the string "ABC123" on the part. See generally specification at page 7 and page 8.

In order for a machine for example a computer to be able to read the encoded information, it is typically necessary to rebuild or reconstitute the original 2D redundant bit array (containing the message "ABC123") to the maximum extent possible. In the Appellant's invention, since the array of dots representing the characters is redundant, it is not necessary to rebuild it 100 per cent in the dots put down to form the human-readable character form. Each subset of bits (selected by the character masks) contains a portion of the original 2D bit pattern. The computer reading of the part number proceeds as follows. Typically, an electronic camera attached to the computer images the string of characters printed on the part in one image. The image(s) is/are processed to eliminate the background leaving the shaped bit pattern. In the case of an image of the string of letters, computer processing can be applied to separate out each bit pattern corresponding to each individual letter. See generally specification at page 9.

At this point, there exist a number of bit images corresponding to the number of characters in the printed message (for the above example i.e. ABC123, six images). The composite image to be assembled for computer recognition is formed by creating an image consisting of a "union" of the individual bit images of all the characters. The union is formed by making sure that the spatial indicator in each individual image is superimposed in the final composite image. This facilitates in reconstituting to a great extent the fraction of the original rectangular 2D bit array redundant encoding of the character string. Each masked bit-character may have contained 5-10% of the area of the original 2D redundant bit array. It is usual that some portions of the original 2D bit array may be represented multiple times. By superimposing the areas of the original 2D bit pattern selected by each character mask, a large percentage of the original 2D redundant bit array is reconstituted. This pattern is then processed by the "inverse" encoding algorithm, to create the original 2D array from the string. This yields the original character string. See generally specification at page 9 and 11.

C. Appellants Claims Read on the Invention.

Claim 1 recites a part marking including at least one multiplicity of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, said at least one multiplicity of marks having an appearance to human vision resembling at least one character, and said two-dimensional redundant bit patterns comprising repeating patterns of a bit string forming a respective machine readable code corresponding to said at least one character. See, e.g., specification at page 3 lines 8-11; page 4 lines 5-8; page 7 lines 6-10; and page 10 lines 2-5 and Fig.1.

Claim 2 depends on claim 1 and recites the part marking further including a plurality of respective multiplicities of machine-detectable marks arranged in accordance with said two-dimensional redundant bit patterns, each of said respective multiplicity of marks having an appearance to human vision resembling a respective character. See, e.g., specification at page 7 lines 32 to page 8 line 8.

Claim 3 depends on claim 2 and recites a part marking further including machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable. See, e.g., specification at page 11 lines 5-11 and Fig. 3.

Claim 4 depends on claim 1 and recites a part marking wherein the machine-detectable marks comprise dots superimposed on an optically contrasting background. See, e.g., specification at page 4 lines 27-29.

Claim 5 depends on claim 1 and recites the code used for part marking code is ASCII code. See, e.g., specification at page 10 lines 5 – 20.

Claim 7 recites a part marking comprising a plurality of human-readable characters formed in respective areas containing respective arrays of machine detectable marks, each of said array of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, each of said arrays of machine-detectable marks in said respective areas having shapes indicative of said human-readable characters, and each of said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective machine detectable codes corresponding to said human-readable characters. See, e.g., specification page 4 lines 19-25.

Claim 8 depends on claim 7 and recites the part marking further comprising machine-detectable respective spatial registration indicators formed in said respective areas and placed such that each of said respective arrays of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable. See, e.g., specification at page 11 lines 5-11 and Fig. 3.

Claim 9 depends on claim 7 and recites the part marking where the machine-detectable marks comprise dots superimposed on an optically contrasting background. See, e.g., specification at page 4 lines 27-29.

Claim 10 depends on claim 7 and recites the part marking wherein said codes are ASCII codes. See, e.g., specification at page 10 lines 5-20.

Claim 12 recites a system for automatic identification of a part, including a part comprising a plurality of respective multiplicities of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, each of said respective multiplicities of machine–detectable marks having an appearance to human vision resembling a respective character, and said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective codes corresponding to said respective character; an imager for imaging an area of said part occupied by said marks to produce electrical

signals having characteristics which allow discrimination between electrical signals derived from imaging of marks and electrical signals derived from imaging of areas outside of marks; and a computer programmed to derive said respective codes from said electrical signals output by said imager. See, e.g., specification page 5 lines 8-32 and page 8 lines 31 to page 9 lines 8 and Fig. 2.

Claim 13 depends on claim 12, wherein the computer is programmed to perform the steps of: digitizing said electrical signals to form respective bit maps, comprising bits corresponding to each of said respective multiplicities of machine-detectable marks; spatially registering said respective bit maps; forming a union of said spatially registered respective bit maps; and detecting bit strings, corresponding to said respective codes, in the composite bit map resulting from the union of said spatially registered respective bit maps. See, e.g., specification at page 5 lines 19-30 and page 9 lines 16-27.

Claim 14 depends on claim 13 and recites the part further comprising machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable. See, e.g., specification at page 11 lines 5-11 and Fig. 3.

Claim 16 depends on claim 12 and recites the codes being ASCII codes. See, e.g., specification at page 10 lines 5-20.

Claim 17 recites a method of marking parts for automatic identification, comprising the steps of forming respective human-readable characters in respective areas on said part by applying respective arrays of machine-detectable marks arranged in two-dimensional redundant bit patterns each of said respective arrays of machine-detectable marks having respective shapes indicative of each of said respective human-readable characters, and said two-dimensional redundant bit patterns comprising a repeating pattern of a respective bit string forming respective codes corresponding to each of said

respective human-readable characters. See, e.g., specification at page 5 lines 1-7.

Claim 18 recites a method of automatically identifying parts, comprising the following steps: marking a part with respective human-readable character-shaped arrays of machine-detectable marks; acquiring an image of said part marking; digitizing the acquired image to form respective bit maps comprising bits corresponding to each of said respective human-readable character-shaped arrays of machine-detectable marks; spatially registering said respective bit maps; forming a union of said respective spatially registered bit maps; and decoding the composite bit map resulting from the union of each of said respective spatially registered bit maps to identify the part. See, e.g., specification at page 5 lines 33 to page 6 line 12.

Claim 19 recites a system for automatically identifying parts, comprising a part marked with respective human-readable character-shaped arrays of machine-detectable marks; an imager for acquiring an image of said part marking; and a computer programmed to perform the following steps: digitizing the acquired image to form respective bit maps comprising bits corresponding to each of said respective human-readable character-shaped arrays of machine-detectable marks; spatially registering each of said respective bit maps forming a union of said respective spatially registered bit maps; and decoding the composite bit map resulting from said union of the spatially registered bit maps to identify said part. See, e.g., specification page 5 lines 8-32, page 8 lines 31 to page 9 lines 8, page 9 lines 16-27 and Fig. 2.

Claim 20 recites a system of claim 19, where the machine-detectable marks comprise dots superimposed on an optically contrasting surface of the part. See, e.g., specification at page 4 lines 27-29.

VI. Issues Presented.

Are claims 1-5, 7-10 and 12-20, anticipated by the prior art reference, US 6,434,340 (hereinafter referred to as Behrens).

VII. Grouping of Rejected Claims.

For purposes of addressing the issues in this appeal, Appellant suggests the following grouping of claims:

Group 1: claims 1-5 and 7-10;

Group 2: claims 12-20.

VIII. Argument.

The art cited by the Examiner to support the rejections of claims 1-5, 7-10 and 12-20, does not anticipate, suggest, teach or disclose, the part marking and the technique thereof as described in present invention.

A. The Prior Art Relied Upon in the Final Rejection.

The rejection of claim 1-5, 7-10 and 12-20 is made under 35 USC § 102 (e), on the premise that the patent of Behrens anticipates the claims of the Appellant's application. As set forth below, Appellant submits that the Behrens patent does not anticipate the Appellant's claims under USC § 102 (e) as Behrens does not disclose, teach or suggest the Appellant's invention.

The Appellant's invention, as recited in amended independent claims 1, 7,12, 17, 18 and 19, and as described above, is particularly well-adapted to provide a single part marking which can be simultaneously read by both humans and computers (or other detector apparatus). The Appellant's invention has an advantage that it eliminates the need to have two separate markings, one

readable by humans and the other readable by a computer or a imager to be put on a part for its identification, which has been clearly identified as a problem in prior art (See specification page 2 line 34 to page 3 line2). In contrast, Behrens requires two separate set of markings, one human readable, the second computer readable, to provide recorded information on a photographic film for use in traffic monitoring system,. There is absolutely no indication, or statement that suggests a need for a single set of markings that are both human readable and machine readable in Behrens.

The Behrens patent discloses a method of recording data on a photographic film. Behrens patent is directed specifically towards traffic monitoring installations that require recording of parameters such as time, speed or location to document violations of traffic regulations. In Behrens, in addition to human-readable format of data, a second format is applied which is machine-readable (See column 1 lines 5-15 and column 2 lines 18-22).

The problem being addressed in Behrens is that the data recorded on photographic film are often not reliable since the data have to be recorded on the film, while the film is in motion (See column 1 lines 65 to column2 line 9 and column3 lines 48-58).

The measuring device in the traffic monitoring installation measures the required data and sends the data to a data processing unit. The data processing unit processes and generates data to energize a LED matrix of a writing head. The writing head reflects the data representation (characters provided by data processing unit) in a field 38 in margin of the photographic film. This process is done during the feeding of the film. In addition, the data are represented in another format e.g. in a dot representation (may be provided redundantly) in another field 40, and this format is machine-readable only. Since the relative positions of the dots depend on the speed of the film feeding and therefore may not accurately represent the desired data, Behrens provides for a specific read out mechanism to test for errors in recording (See generally column 2 and column 3).

Fig. 2, in Behrens distinctly points out two distinct sets of markings, one being alphanumeric in the field 38 and the other being a pattern of dots that is in a machine readable format in the field 40.

Fig. 3 and Fig. 4 represent two alternate techniques for data processing for recording the alphanumeric and machine-readable formats on the photographic film (See generally column 4 and column 5). Fig. 5 illustrates the read–out procedure for the data in the margin of the photographic film. In the read-out procedure as is clear from Fig. 5 and the description thereof, the characters (human readable) from field 38 are scanned, coded and stored. The machine-readable pattern from field 40 is converted to digital data and the redundant data are compared to see if they are identical. If the data are not identical, the measurement is discarded and indicates an error in recording. If the redundant data are identical, they are compared to the stored data from field 38; if the data are identical, the measurement is processed. If the data are not identical, it again indicates an error in measurement and the measurement is discarded (See generally column 5).

B. The Cited Reference Does Not Anticipate the Present Invention.

Behrens patent as summarized above, is devoid of any disclosure that teaches or suggests Appellant's invention of one set of markings, having a dual characteristic of being readable by both by humans and machines.

"Anticipation requires the presence in a single prior art reference, a disclosure of each and every element of the claimed invention, arranged as in the claim." Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). Thus, the absence from the reference of any claimed element negates anticipation and anticipation cannot be found in a situation where the claimed elements are arranged differently in the prior art or if any of the claimed elements are absent from the prior art. The Behrens reference does not disclose each element of the present invention as claimed in independent claims 1, 7, 12, 17, 18 and 19. For example, the present invention as recited in the independent claims provides apparatus and methods in which

the same grouping of markings provides both a human-readable form and a machine readable form. This arrangement is directly at variance with Behrens, which discloses and teaches the need for separate and distinct sets of human readable and machine readable markings. In the Appellant's invention as recited in the claims, a string of human readable alphanumeric characters is printed in a two-dimensional redundant pattern and presented in a manner which is also readable by an imager and a computer. In other words, two-dimensional pattern is presented in such a way that the pattern can be simultaneously read by both humans and machines. Support for this argument can be found, for example, on page 2, paragraph 7, and page 3, paragraph 9 of the specification. Behrens is completely barren of any disclosure, teaching or suggestion towards this inventive aspect, namely a single set of marking, both human and machine readable, of Appellant's invention.

Specifically, Behrens does not disclose, the following highlighted elements of the Appellant's invention which are directed towards a single set of marking being both human and machine readable, the claim 1 recitation of "a part marking comprising at least one multiplicity of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, said at least one multiplicity of marks having an appearance to human vision resembling at least one character"; the claim 7 recitation of "a part marking comprising a plurality of human-readable characters formed in respective areas containing respective arrays of machine detectable marks "; the claim 12 recitation of "each of said respective multiplicities of machine-detectable marks having an appearance to human vision resembling a respective character"; the claim 17 recitation of "respective human-readable characters in respective areas on said part by applying respective arrays of machine-detectable marks arranged in two-dimensional redundant bit patterns"; the claim 18 recitation of "marking a part with respective human-readable character-shaped arrays of machine-detectable marks", and claim 19 recitation of "a part marked with respective human-readable character-shaped arrays of machine-detectable marks". See generally specification at page 7 and 8, and Fig. 1.

Another example of a element not disclosed or taught by Behrens is the inventive concept of using repeating pattern of bit string in the Appellant's invention as mentioned in claim 1 recitations of "...said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective machine readable code corresponding to said at least one character" and similar recitation in claim 7, "...said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective machine detectable codes corresponding to said human-readable characters; claim 12 recitation of "...said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective codes corresponding to said respective character.." , and claim 17 recitation of "...said two-dimensional redundant bit patterns comprising a repeating pattern of a respective bit string forming respective codes corresponding to each of said respective human-readable characters ...". The support of these claim recitation can be found in the specification page 10, lines 2-16

Similarly there are several other elements of Appellant's invention which are not taught or suggested by Behrens, for example, claim 3 recitation of "...machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable." And similar recitations in claims 8, "...machine-detectable respective spatial registration indicators formed in said respective areas and placed such that each of said respective arrays of machine-detectable marks are combinable by aligning said respective spatial registration indicators..", claim 13 recitation of ".. spatially registering said respective bit maps; forming a union of said spatially registered respective bit maps; and detecting bit strings, corresponding to said respective codes, in the composite bit map resulting from the union of said spatially registered respective bit maps, claim 14 recitation of "...machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable.", Claim 18 and claim 19

recitation of "... spatially registering said respective bit maps; forming a union of said respective spatially registered bit maps; and decoding the composite bit map resulting from the union of each of said respective spatially registered bit maps to identify the part. " These claim recitations are adequately supported in the specification, at page 11, lines 5-15 and Fig. 3.

In addition of absence of any disclosure, teaching or suggestion of above mentioned highlighted elements in Behrens, Appellant further submits that the Behrens patent is misconstrued in both the Office Actions dated 22 August 2002 and 7 January 2003, and that the construction of the Behrens patent set forth in these Office Actions leads to an improper conclusion. Behrens mentions human and machine readable formats but it needs these to be presented separately and distinctly in contrast to Appellant's invention of single marking being both human and machine readable. Appellant respectfully submits that one cannot use the invention itself as a road map to extrapolate from reference with the benefit of hindsight provided by the invention. Appellant further submits that to draw on hindsight knowledge of the patented invention, when the prior art does not contain or suggest that knowledge, is to use the invention as a template for it own reconstruction - an illogical and inappropriate process by which to determine patentability.

Further, the art cited is not reasonably pertinent to the solution of the problem sought to be solved by the Appellant's invention, and thus there would have been no motivation to look to such an art and it cannot even support a rejection art under section 103. As pointed out in the description of the prior art reference, Behrens is addressing a problem of recording data on photographic film, while the film is in motion and detecting any erroneous reading by using two separate markings, one being human readable and other being machine readable which are registered in two different fields on the photographic film. Indeed Behrens actually teaches away from the present invention since it requires two distinct set of markings which are registered in two separate fields compared to Appellant's invention of one set of markings which is both human and machine readable. It is well established law that "[a] reference [is] said to teach away when a person of ordinary skill, upon reading the reference, would

be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." In re Gurley, 31 U.S.PQ.2d 1130, 1131 (Fed. Cir. 1994). Behrens discloses that all data are applied in two different formats, one being human readable and the other machine readable in two different fields; at no time does Behrens disclose or suggest that a single format for data recordation be used that is simultaneously human readable and machine readable. Behrens specifically argues that two formats should be used so that they can be compared so as to reduce the potential for errors while reading the data (see Behrens, column 2, lines 10-25, column 5, lines 30 –65).

There is simply no indication or statement in Behrens, that the recording of two set of marking on the photographic film is in any way not satisfactory. Thus, there is thus no teaching or suggestion in the prior art that may lead to Appellant's invention. In addition, Behrens does not address, nor need ever address, questions relating to single set of marking. Rather, the central question presented by Behrens is testing the recorded data in order to discard any erroneous measurement which got recorded on the photographic film during the film's motion. Therefore, the art cited to support the rejection of the claims in the instant application is devoid of any teaching or suggestion which may lead to Appellants invention.

C. The Claims of Group 1 and Group 2 are Patentably Distinct From the Cited Art.

1. The Group 1 Claims.

Group 1 claims, (claims 1-5 and 7-10) are patentably distinct from the Behrens patent cited against these claims. Claims 2-5 depend directly or indirectly from claim 1 and claims 8-10 depend directly or indirectly from claim 7; claim 1 and claim 7, both are directed towards a part marking which comprises the human readable and machine readable aspects. Claim 1 recites a part marking having at least one multiplicity of machine detectable marks having an appearance to human vision resembling characters and claim 7 recites a part marking comprising human readable characters formed in areas occupied by arrays of machine detectable parts, the arrays having a shape of human readable character. Claim 2 recites a plurality of multiplicity of marks, claim 3 recites spatial registration indicators for registering of machine detectable marks, claim 4 recites machine detectable marks comprising dots superimposed on an optically contrasting medium and claim 5 recites ASCII codes. Claim 8-10 recite similar details (as in claims 2-5) with respect to part marking of claim 7.

The part marking as defined in independent claims 1 and 7 differs from Behrens patent, primarily because claims 1 and 7 explicitly recite the dual characteristic (human and machine readable) of a single part marking while Behrens has no mention of such a single part marking. Fig. 2 in Behrens distinctly illustrates two markings in two separate fields 38 and 40 respectively. Further, Behrens does not disclose, teach or suggest the use of spatial indicators as mentioned in claim 3 and claim 8 of Appellant's application. Elements 42 and 44 in Fig. 2 of Behrens serve an entirely different purpose, these are dots indicating the corners of a rectangle indicating the side length of the rectangle in the film feeding direction, where the machine detectable marks have to be recorded. On the other hand, special indicators in Appellant's invention are used for aligning the human readable characters for the purpose of machine

readability of the encoded bit string presented within the human readable characters. Thus Behrens in no way reads upon the Group 1 claim.

The arrangement of the present invention as recited in the Group 1 is thus patentably distinct from that of the Behrens patent.

2. The Group 2 Claims.

Group 2 claims (claims 12-20) are patentably distinct from the art cited against these claims, namely the Behrens patent. Claims 12, 17, 18 and 19 are independent claims. Claim 13-16 depend from claim 12, claim 20 depends from 19. These claims are directed towards system and method for automatic identification of a part and a method of marking parts for automatic identification.

Claim 12-16 and claims 19-20 are directed towards a system for automatic identification of parts. The system described in independent claims 12 and 19 recites a part as defined in Group 1 claims, hereinabove, an imager for imaging the part and producing electrical signals from the imaged part and a computer to derive the codes from electrical signals. Comparing this with Behrens system of identification of recorded data as described in reference with Fig. 5, yields absolutely no similarity of any kind. In Behrens, the human readable format in field 38 is scanned, converted to codes and stored. Next, several steps are undertaken to convert the machine readable format in field 40 into digital format. Next the redundant data in the digital format are compared if they are identical or not. If they are not identical, the data are discarded, if they are identical, the data are compared to stored data from field 38. Again if the data are not identical, they are discarded and if they are identical, the measurement is processed. Behrens system is thus primarily targeted to reduce errors in recording of data on a photographic film which is in motion during data recordal. Thus the system in Behrens addresses the identification of recorded data by a completely different approach involving sequential reading of human readable and machine readable formats and no disclosure, suggestion or teaching can be drawn from Behrens system which reads on Appellant's independent claims 12 and 19. Dependent claims 13-16 and 20 are similarly

deemed patentably distinct from Behrens art, as these are derived from independent claims 12 and 19 respectively.

Independent claims 17 and 18, recite a method of marking parts for automatic identification and a method of automatically identifying parts respectively. Claim 17 recites the steps of forming respective human readable characters in respective areas, by applying respective arrays of machine detectable parts arranged in two dimensional redundant bit pattern. The respective arrays have respective shapes indicative of respective human readable characters. The two dimensional redundant bit pattern comprises a repeating pattern of respective bit string in form of codes corresponding to respective human readable character. Behrens describes two techniques as shown in Fig. 3 and Fig. 4 for recording the data in two fields, field 38 having the human readable data and field 40 having the machine readable data. As is clear from both Fig. 3 and Fig.4, the Behrens method includes distinct steps for character generation and its display in field 38 and distinct steps for digital representation and display in field 40. Thus the Behrens patent in fact teaches away from the method of Appellant's part marking of claim 17, where the human and machine readable aspects are represented in a single format. Claim 18 recites a method of automatically identifying parts which includes, marking a part with respective human readable character shaped arrays of machine detectable marks, acquiring an image of the part, digitizing the image to form respective bit maps corresponding to each of human readable character shaped array of machine detectable marks, spatially registering these bit maps, forming a union of the bit maps and decoding the composite bit map resulting from the union to identify the part. Behrens patent does not disclose, suggest or teach even remotely the method of claim 18 of Appellant's application. Fig. 5 of Behrens as described hereinabove teaches a method of separately identifying human and machine readable formats and comparing the same to find any errors in recording of data. There is complete absence from Behrens patent of any disclosure, suggestion or teaching that indicates human readable character shaped arrays of machine detectable marks and other aspects of claim 18 such as a union of bit maps.

The present invention as recited in the Group 2 claims is thus similarly patentably distinct from the art cited against these claims.

The art cited against Appellant's invention thus neither discloses not teaches or suggests the invention claimed in the instant case.

IX. Conclusion.

For the reasons set forth above, it is respectfully submitted that claims 1-5, 7-10 and 12-20 are patentable and should be allowed. Appellant requests that the rejection of these claims under section 102 be reversed.

Respectfully submitted,

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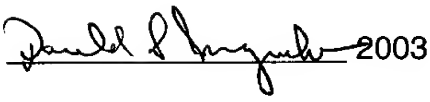

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APPENDIX

X. CLAIMS ON APPEAL

1. (amended). A part marking comprising at least one multiplicity of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, said at least one multiplicity of marks having an appearance to human vision resembling at least one character, and said two-dimensional redundant bit patterns comprising repeating patterns of a bit string forming a respective machine readable code corresponding to said at least one character.

2. (amended) The part marking as recited in claim 1, further comprising a plurality of respective multiplicities of machine-detectable marks arranged in accordance with said two-dimensional redundant bit patterns, each of said respective multiplicity of marks having an appearance to human vision resembling a respective character.

3. (amended) The part marking as recited in claim 2, further comprising machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable.

4. The part marking as recited in claim 1, wherein said machine-detectable marks comprise dots superimposed on an optically contrasting background.

5. (amended) The part marking as recited in claim 1, wherein said code is ASCII code.

7. (amended) A part marking comprising a plurality of human-readable characters formed in respective areas containing respective arrays of

machine detectable marks, each of said array of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, each of said arrays of machine-detectable marks in said respective areas having shapes indicative of said human-readable characters, and each of said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective machine detectable codes corresponding to said human-readable characters.

8. (amended) The part marking as recited in claim 7, further comprising machine-detectable respective spatial registration indicators formed in said respective areas and placed such that each of said respective arrays of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable.

10. (amended) The part marking as recited in claim 7, wherein said codes are ASCII codes.

12. (amended) A system for automatic identification of a part, comprising:

a part comprising a plurality of respective multiplicities of machine-detectable marks arranged in accordance with two-dimensional redundant bit patterns, each of said respective multiplicities of machine–detectable marks having an appearance to human vision resembling a respective character, and said two-dimensional redundant bit patterns comprising a repeating pattern of a bit string forming respective codes corresponding to said respective character;

an imager for imaging an area of said part occupied by said marks to produce electrical signals having characteristics which allow discrimination between electrical signals derived from imaging of marks and electrical signals derived from imaging of areas outside of marks; and

a computer programmed to derive said first and second codes from said electrical signals output by said imager.

13. (amended) The system as recited in claim 12, wherein said computer is programmed to perform the steps of:

digitizing said electrical signals to form respective bit maps, comprising bits corresponding to each of said respective multiplicities of machine-detectable marks;

spatially registering said respective bit maps;

forming a union of said spatially registered respective bit maps; and

detecting bit strings, corresponding to said respective codes, in the composite bit map resulting from the union of said spatially registered respective bit maps.

14. (amended) The system as recited in claim 13, wherein said part further comprises machine-detectable respective spatial registration indicators placed such that each of said respective multiplicities of machine-detectable marks are combinable by aligning said respective spatial registration indicators such that said respective combined multiplicity of marks remain machine detectable

16. (amended) The system as recited in claim 12, wherein said codes are ASCII codes.

17. (amended) A method of marking parts for automatic identification, comprising the steps of forming respective human-readable characters in respective areas on said part by applying respective arrays of machine-detectable marks arranged in two-dimensional redundant bit patterns each of said respective arrays of machine-detectable marks having respective shapes indicative of each of said respective human-readable characters, and

said two-dimensional redundant bit patterns comprising a repeating pattern of a respective bit string forming respective codes corresponding to each of said respective human-readable characters.

18. (amended) A method of automatically identifying parts, comprising the following steps:

marking a part with respective human-readable character-shaped arrays of machine-detectable marks;

acquiring an image of said part marking;

digitizing the acquired image to form respective bit maps comprising bits corresponding to each of said respective human-readable character-shaped arrays of machine-detectable marks;

spatially registering said respective bit maps;

forming a union of said respective spatially registered bit maps; and

decoding the composite bit map resulting from the union of each of said respective spatially registered bit maps to identify the part.

19. (amended) A system for automatically identifying parts, comprising:

a part marked with respective human-readable character-shaped arrays of machine-detectable marks;

an imager for acquiring an image of said part marking; and

a computer programmed to perform the following steps:

digitizing the acquired image to form respective bit maps comprising bits corresponding to each of said respective human-readable character-shaped arrays of machine-detectable marks;

spatially registering each of said respective bit maps;

forming a union of said respective spatially registered bit maps; and

decoding the composite bit map resulting from said union of the spatially registered bit maps to identify said part.

20. (added) The system as recited in claim 19, wherein said machine-detectable marks comprise dots superimposed on an optically contrasting surface of said part.

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Serial No.: 09/681,953

Filed: June 29, 2001

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